FEMA

KENTUCKY DIVISION OF WATER
COOPERATING TECHNICAL PARTNERS
MAPPING ACTIVITY STATEMENT

Mapping Activity Statement No. 1 – Digital Flood Insurance Rate Map Production and Development of Updated Flood Data

In accordance with the Cooperating Technical Partners (CTP) Partnership Agreement dated August 16, 1999 between the Kentucky Division of Water (KDOW) and the Federal Emergency Management Agency (FEMA), Mapping Activity Statement (MAS) No. 1 is as follows.

SECTION 1—OBJECTIVE AND SCOPE

The objective of the Flood Map Project documented in this MAS is to develop Digital Flood Insurance Rate Maps (DFIRMs) and Flood Insurance Study (FIS) reports for the following eight counties within the State of Kentucky: Breathitt, Clay, Gallatin, Kenton, Knott, Leslie, Letcher, and Trimble. This MAS describes general procedures that will be used for the countywide projects. Specific scoping details and any variations from the procedures outlined in this MAS for each county will be included in Appendices A through H, which will be submitted at the conclusion of Activity 1.

The DFIRMs and FIS reports will be produced in the FEMA Countywide Format. DFIRM and FIS data will be referenced to the North American Vertical Datum of 1988 (NAVD88).

Existing GIS data and study needs for each of the eight counties and their associated communities are currently being researched, obtained, organized and will be provided in accordance with Activity 1. Scoping is necessary to determine the final scope of work for each of these projects, but at a minimum, effective DFIRM and FIS data will be converted to digital and Countywide format. In addition the Mapping Partners involved in this project will develop new and/or updated flood hazard data for selected flooding sources, as summarized in the detailed scoping reports for each county found in Appendices A-H of this MAS.

This Flood Map Project will be completed by the following

- The Kentucky Division of Water (CTP);
- The Federal Emergency Management Agency (FEMA) Region IV;
- The Michael Baker Corporation, the FEMA National Service Provider (NSP); and
- Fuller, Mossbarger, Scott and May Engineers, Inc., the CTP study contractor (SC)

The CTP shall notify FEMA and the NSP by e-mail of all meetings with community officials at least one week prior to the meeting (with as much notice as possible). FEMA and/or the NSP may or may not attend the community meetings

The activities for this Flood Map Project, including required Quality Assurance/Quality Control (QA/QC) reviews, and the Mapping Partners that will complete them are summarized in the table below. The sections of this MAS that follow the table below describe the specific activities, responsible Mapping Partner(s), FEMA standards that must be met, and resultant map components.

Activities	CTP	FEMA
Activity 1 – Scoping	X	X
Activity 2 – Outreach	X	
Activity 3 – Field Surveys and Reconnaissance	X	
Activity 4 – Topographic Data Development	X	
Activity 5 – Independent QA/QC Review of Topographic Data	X	X
Activity 6 – Hydrologic Analyses	X	
Activity 6A – Coastal Flood Hazard Analyses	N/A	N/A
Activity 7 – Independent QA/QC Review of Hydrologic Analyses	X	X
Activity 7A – Independent QA/QC Review of Coastal Hazard Analyses	N/A	N/A
Activity 8 – Hydraulic Analyses	X	
Activity 9 – Independent QA/QC Review of Hydraulic Analyses	X	X
Activity 10 – Floodplain Mapping (Detailed Riverine or Coastal Analysis)	X	
Activity 10A – Floodplain Mapping (Redelineation Using Effective Flood Profiles and Updated Topographic Data)	X	
Activity 10B – Floodplain Mapping (Refinement or Creation of Zone A)	X	
Activity 11 – Independent QA/QC Review of Floodplain Mapping (Revised Areas)	X	X
Activity 12 – Base Map Acquisition	X	
Activity 13 – DFIRM Production (Non-Revised Areas)	X	
Activity 13A – Independent QA/QC Review of DFIRM Production (Non-Revised Areas)	X	X
Activity 14 – DFIRM Production (Merge Revised and Non-Revised Information)	X	
Activity 14A – Application of DFIRM Graphic and Database Specifications	X	
Activity 14B – Independent QA/QC Review of DFIRM Product Meeting FEMA Graphic and Database Specifications	X	X
Activity 15 – Preliminary DFIRM and FIS Report Distribution	X	X
Activity 16 – Post-Preliminary Processing	X	X

FEMA has developed tools to assist in the development of the flood hazard data studies and the Digital Flood Insurance Rate Maps (DFIRMs) if the CTP wishes to use them. FEMA will provide all CTPs access to and training in these tools. The tools available at this time include WISE software and the DFIRM production tools. The use of these tools will improve the Map Modernization Program and efficiency of all mapping partners.

As part of the final scoping for each county performed during Activity 1, the CTP shall evaluate the level or risk and study methodology for each community utilizing the guidance for data quality standards outlined in Chapter 7 of the *Multi-Year Flood Hazard Identification Plan (MHIP)*. Those standards are risk-based and the identified Risk Classification for each of the countywide flood map projects presented in this MAS has been determined to be Risk Class "C" with the only exception being the northern portion of Kenton County, which is Class "B".

QA/QC review activities may be performed by CTPs or FEMA at the discretion of FEMA. The CTP and/or its contractor(s) will be performing an independent QA/QC review of project deliverables prior to submission and will submit a QA/QC plan with checklists to the Regional Project Officer for approval. FEMA will also be performing periodic audits and overall study/project management to ensure study quality.

FEMA will be providing download/upload capability for intermediate data submittals through the Management Information Portal (MIP). Data submittals uploaded via the MIP, will include the same data required prior to the existence of the MIP. If the MIP is unavailable, data submittals will be delivered to FEMA Region IV by digital media in addition to hardcopy, if hardcopy is required by law. Data submittals to FEMA will be formatted in accordance with Appendices M & N of the *Guidelines and Specifications for Flood Hazard Mapping Partners* as appropriate.

Activity 1 – Scoping

Responsible Mapping Partner: CTP

Scope: This task involves collecting data from a variety of sources including community surveys, other Federal and State Agencies, NFIP State Coordinators, Community Assistance Visits (CAV's) and FEMA archives. The CTP will evaluate the effective FIS reports and FIRM maps to see if they need to be updated. Lists of mapping needs will be obtained from the MNUSS database, community surveys and CAV's if available.

Data collection will include obtaining the best available base map materials (corporate limits, roads, orthophotos, etc) along with stream centerline files. The acquired data may be imported into the scoping tool and used during the Scoping Task. In the Scoping Tool all streams should have unique names, the limits of the effective FEMA studies should be identified, LOMC areas should be identified, and community requests should be identified. This task also includes populating the streamlines with existing pipeline and scoped studies currently underway.

In cooperation with the FEMA Region, a Project Management Team will be established consisting of the the Kentucky Division of Water, FEMA's Regional Project Officer, the NSP, local officials from each county being studied, and other appropriate officials. The Project Management Team will be responsible for coordinating the activities of this project and completing all tasks identified in this Mapping Activity Statement.

Preliminary Research Activities can be separated into two categories—researching effective information and researching available data for the Flood Map Project. The following tasks shall be completed to research effective information: inventory the FEMA archives for effective FIRM panels, FBFM panels, FIS reports, and other flood hazard data or existing study data; summarize the information in the MNUSS database; summarize contiguous community agreement checks; review CAV and CAC files; and develop a "scoping map" and an overview of the results of the research.

The CTP has already conducted Scoping Meetings in each of the eight project counties and details will be included in the Scoping Reports for each county to be provided in Appendices A-H. The purpose of these meetings was to present the current information to the local officials (state, county and municipal) and coordinate on prioritization and identification of study areas. The CTP compiled the necessary information for the meetings. These items may have included: FIS and FIRM data for affected communities; USGS quads for the study area; best available community base map(s); effective FIRM summary; an inventory of available data; Scoping Map; Scoping Meeting Agenda/Minutes form; Aerial photos/topographic mapping if available; existing drainage studies or other H&H data; Community master plan(s)/Drainage Master Plan(s); Zoning Maps; Street Maps; As-built plans; and Floodplain Ordinance(s).

The project management team shall review the initial mapping needs list, review the research findings, and make selections of proposed methods for obtaining/producing flood data. Any additions or changes to the needs list shall be discussed with all members. All needs shall also be prioritized. In general, highest priority shall be given to the following areas: areas of dense existing or anticipated development, including areas where new road crossings have been constructed over stream(s); areas affected by flood-control structures and/or channelization; areas where natural physical changes in the floodplain have been significant (due to subsidence or extreme erosion, for example); areas that were studied by approximate methods and unmapped areas, especially those with development pressure; areas where the community has experienced flooding outside mapped floodplains, with severe damage to buildings and/or infrastructure; areas where mapped flood hazards do not match those shown on contiguous FIRMs (unless those FIRMs are not considered to be accurate); and areas where flood data (BFEs, floodplains, and regulatory floodways) are likely to be changed the most by a restudy.

Based on the discussion of mapping needs, the CTP and FEMA Project Officer will finalize the areas to be included in the project (based on recommendations provided by the Project Team). Areas to be studied by detailed and approximate methods shall be identified. The following issues will be discussed and refined: Review and Refinement of Flood Hazard Identification Methodologies, Review of Proposed Paneling Scheme, Review and Refinement of Base and Topographic Map Source, and Finalization of Map Production and Database Options.

The CTP will be acting as the Consultation Coordination Officer (CCO) for this flood study as identified in Title 44 of the Code of Federal Regulations Part 66. At this point, the CTP will prepare and set up the Community Case File and Flood Elevation Docket for the maintenance of all communication and coordination as outlined in 44CFR Part 66 and 67. All of this data will be submitted to FEMA upon completion of this project.

Standards: All work under Activity 1 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: Upon completion of scoping efforts, the CTP shall deliver the following to the FEMA Regional Project Officer in accordance with the schedule outlined in Section 6 for this Activity.

- The Final Scoping Documents for each county (Appendices A-H), with all of the components arranged according to the "Partner Flood Map Modernization Program Scoping Report" template provided by the FEMA Regional Project Officer, will be delivered in accordance with the schedule outlined in Section 6 for this Activity to the Regional Project Officer for approval.

- If the WISE scoping tool is used, the CTP shall upload appropriate data sets obtained or derived for the scoping efforts to the MIP to facilitate FEMA efforts to track the areas chosen to be studied as well as to document areas not identified as needs.

- The CTP shall update the MNUSS database to include all needs identified during scoping in order for FEMA to track those areas which are being studied and those areas that will still need a study.

- QA/QC Plan for the review of the mapping project outlined in this MAS. This will include the checklists developed for that review.

Activity 2 – Outreach

Responsible Mapping Partner: CTP

Scope: The outreach activities for a Flood Map Project can best be understood as a process that begins during the Project Scoping phase and continues through the Map Production and Post-preliminary phases. A regulatory overview of required activities is followed by a description of tools that can be used in working with stakeholders to keep them informed and to solicit their input.

The overarching goal for conducting outreach is to create a climate of understanding and ownership of the mapping process at the State and local levels. Well-planned outreach activities can reduce political stress, confrontation in the media, and public controversy, which can arise from lack of information, misunderstanding, or misinformation. These outreach activities also can assist FEMA and other members of the Project Team in responding to congressional inquiries.

The CTP will work with the FEMA Regional Office during the initiation of this activity to determine an Outreach Plan for implementation throughout the Mapping Project. The FEMA Regional Office will have access to many outreach tools that have been developed for this process that can be utilized or customized for use by the CTP.

All communication with local governments will be done in accordance with Title 44 Code of Federal Regulations Part 66.

Standards: All work under Activity 2 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: Upon determination of an Outreach and Coordination Approach, the CTP shall deliver the following to the FEMA Regional Project Officer in accordance with the schedule outlined in Section 6 for this Activity:

- A report detailing outreach and coordination activities will be delivered at the beginning of this project;

- Backup or supplemental information used in writing this report
- At the completion of the DFIRM process, the CTP will submit a summary of outreach activities and any changes made in the outreach approach based on the actual implementation

Activity 3 - Field Surveys and Reconnaissance

Responsible Mapping Partner: CTP

Scope: To supplement any field reconnaissance conducted during the Project Scoping phase of this project, the CTP shall conduct a detailed field reconnaissance of specific study areas and reaches identified for new or revised studies in each of the counties, as outlined in Appendices A-H, to determine conditions along the floodplain(s), types and numbers of hydraulic and/or flood-control structures, apparent maintenance or lack thereof of existing hydraulic structures, locations of cross sections to be surveyed, and other parameters needed for the hydrologic and hydraulic analyses.

In addition to the initial field reconnaissance, for new detailed analyses the CTP shall conduct field surveys, including obtaining channel and floodplain cross sections, identifying or establishing Temporary Bench Marks, and obtaining the physical dimensions of hydraulic and flood-control structures. The CTP also shall coordinate with other Mapping Partners that are collecting topographic data under Activity 4.

Standards: All work under Activity 3 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the Technical Support Data Notebook (TSDN) format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the CTP shall make the following products available to FEMA by uploading the digital data to the Multi-Hazard Information Platform (MIP) or by submitting the data to the FEMA Regional Project Officer in digital format if the MIP is unavailable. This submittal will occur in accordance with the schedule outlined in Section 6 for this Activity. Where paper documentation is required by State Law for Professional certifications, the CTP shall submit hardcopy in addition to a scanned version of the hardcopy for the digital record.

- A report summarizing the findings of the field reconnaissance;
- Maps and drawings that provide the detailed survey results; and
- Survey notebook containing cross sections and structural data.
- NSP Format Survey Database or Data Delivery consistent with the NSP Data Capture Standards – Appendix N of the Guidelines and Specifications for Flood Mapping Partners

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsam.pdf.

Activity 4 - Topographic Data Development

Responsible Mapping Partner: CTP

Scope: To supplement the field surveys conducted under Activity 3, the CTP may obtain additional topographic data of the overbank areas of the flooding sources studied to delineate floodplain boundaries.

The CTP shall gather information on what topographic data is available for the given community and what accuracy and currency it meets. The CTP shall use this topographic data that is better than that of the original study.

If it is determined that there is no new topographic data available that can be used and it has been demonstrated that there is a need during the scoping phase, the CTP shall generate new topographic data for the flooding sources identified in Appendices A-H using conventional survey methods, aerial photogrammetric techniques, or through LIDAR data acquisition methods. The CTP also shall coordinate with other team members conducting field surveys under Activity 3. Contour interval and/or accuracy for the topographic data shall be selected based on the current FEMA requirements as documented in *Guidelines and Specifications for Flood Hazard Mapping Partners*. No FEMA funds shall be expended on new topographic data unless prior approval is given by the Regional Project Officer after analyzing the request submitted at the end of the scoping period.

This Activity also includes researching the availability of topographic data for each community from other sources and if available assessing its associated degree of accuracy, currency, and usability. In the event that topographic data is available, the data meets or exceeds the minimum standards for inclusion into a DFIRM project, and the data is better than that used for the original study, the CTP shall obtain, format, and incorporate this topographic data to the extent practical during the project.

Although this activity includes preparing existing elevation data from other sources, the CTP will not certify accuracy or precision of the data provided from these other sources. If such certification and/or metadata are available from the data source, the CTP shall submit that information in accordance with the format specified in the *Guidelines and Specifications for Flood Hazard Mapping Partners.*

Topographic data collection under this activity is assumed to include data from Kentucky's Division of Geographic Information (KDGI), the U.S. Geological Survey (USGS), and other sources. Data obtained may include: topographic quadrangle mapping, digital line graphics, tagged vector contours, and digital elevation models (DEMs). Source and citation data will be provided for KDGI and/or USGS datasets, but certification of accuracy, precision, and enhanced metadata will not be provided.

For this activity, the CTP also shall develop topographic maps and/or Digital Elevation Models for the subject flooding sources using the data collected under Activities 3 and 4. In addition, the CTP shall address all concerns or questions regarding Activity 4 that are raised by FEMA during the independent QA/QC review under Activity 5.

Standards: All work under Activity 4 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: Upon completion of topographic data collection and processing for the identified flooding sources, the CTP shall upload the digital data to the MIP or submit the data to the FEMA Regional Project Officer in digital format if the MIP is unavailable, so that the CTP can access it for an independent QA/QC review under Activity 5 in accordance with the schedule outlined in Section 6 for this Activity.

In accordance with the Technical Support Data Notebook (TSDN) format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the CTP shall make the following products available to FEMA. This submittal will occur in accordance with the schedule outlined in Section 6 for this Activity. Where paper documentation is required by State Law for Professional certifications, the CTP shall submit hardcopy in addition to a scanned version of the hardcopy for the digital record.

- Digital topographic maps;

- Report summarizing methodology and results;
- Mass points and breaklines data;
- Digital work maps with contours;
- Checkpoint analyses to assess the accuracy of data, including Root Mean Square Error calculations to support vertical accuracy;
- Identification of remote-sensing data voids and methods used to supplement data voids;
- National Geodetic Survey data sheets for Network Control Points used to control remote- sensing and ground surveys; and
- Metadata compliant with Federal Geographic Data Committee standards.
- NSP Format Terrain Database or Data Delivery consistent with the NSP Data Capture Standards –Appendix N of the Guidelines and Specifications for Flood Mapping Partners

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsam.pdf.

Activity 5 - Independent QA/QC Review of Topographic Data

Responsible Mapping Partner: CTP, FEMA

Scope: The CTP shall review the mapping data generated under Activities 3 and 4 to ensure that these data are consistent with FEMA standards and standard engineering practice and are sufficient to prepare the DFIRM. If the CTP utilizes a contractor to perform the QA/QC, the contractor shall not be the same one who performed the original analyses. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer.

Standards: All work under Activity 5 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the Technical Support Data Notebook (TSDN) format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the CTP shall make the following products available to FEMA by uploading the digital data to the Multi-Hazard Information Platform (MIP) or by submitting the data to the FEMA Regional Project Officer in digital format if the MIP is unavailable. This submittal will occur in accordance with the schedule outlined in Section 6 for this Activity.

- A Summary Report that describes the findings of the independent QA/QC review; and
- Recommendations to resolve any problems that are identified during the independent QA/QC review and documentation of how the problems were resolved.
- If the data changed during the QA/QC process, then the updated deliverables from Activity 4 will be resubmitted at this time.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsam.pdf.

Activity 6 – Hydrologic Analyses

Responsible Mapping Partner: CTP

Scope: For the flooding source(s) listed in Appendices A-H of this MAS where new or revised detailed, limited detailed, or approximate studies will be performed, the CTP shall determine stream discharge values using data developed by the Kentucky Office of the U.S. Geological Survey (USGS) or other suitable methods identified in Appendices A-H. The USGS has already determined peak flood discharges for the 10-, 2-, 1-, and 0.2-percent-annual-chance storm events for various reaches throughout the state. These flood discharges do not account for significant urban areas or for the effects of major lakes and static water bodies. Specific procedures used to account for the effects of these features in project areas are outlined in the scoping details included in Appendices A-H. The CTP will obtain documentation on the development of the USGS peak flood discharges to provide to FEMA for approval prior to performing the hydrologic analyses. In the event that the USGS discharge values are not applicable for a given reach and other alternate hydrologic modeling is performed, analyses will be performed as specified in Appendices A-H.

These flood discharges will be the basis for subsequent hydraulic analyses under Activity 8. In addition, the CTP shall address all concerns or questions regarding Activity 6 that are raised during the independent QA/QC review performed by FEMA during the QA/QC review under Activity 7.

If Geographic Information System (GIS)-based modeling is used, the CTP shall document automated data processing and modeling algorithms and provide them to FEMA to ensure they are consistent with the standards outlined above. Digital datasets (such as elevation, basin, or land use data) are to be documented and provided to FEMA for approval before performing the hydrologic analyses to ensure the datasets meet minimum requirements. If non-commercial (i.e., custom-developed) software is used for the analysis, then the CTP shall provide full user documentation, technical algorithm documentation, and the software to FEMA for review before performing the hydrologic analyses.

For the flooding source(s) listed in Appendices A-H of this MAS where new or revised leverage study data will be incorporated these studies will be assumed acceptable as received. No hydrologic analyses will be performed beyond that provided by the study source. Associated hydrologic modeling and documentation for leverage studies will be delivered if made available, but the CTP will not prepare this data and no adjustments are anticipated.

Standards: All work under Activity 6 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: Upon completion of hydrologic analyses for the identified flood sources, the CTP shall upload the digital data to the MIP or submit the data to the FEMA Regional Project Officer in digital format if the MIP is unavailable, so that the CTP can access it for an independent QA/QC review under Activity 7 in accordance with the schedule outlined in Section 6 for this Activity.

In accordance with the Technical Support Data Notebook (TSDN) format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the CTP shall make

the following products available to FEMA. This submittal will occur in accordance with the schedule outlined in Section 6 for this Activity. Where paper documentation is required by State Law for Professional certifications, the CTP shall submit hardcopy in addition to a scanned version of the hardcopy for the digital record.

- Digital copies of all hydrologic modeling (input and output) files for the 10-, 2-, 1-, and 0.2-percent-annual-chance storm events;
- Digital Summary of Discharges Tables presenting discharge data for the flooding sources for which hydrologic analyses were performed;
- Digital draft text for Section 3.1, Hydrologic Analyses, of the FIS report; and
- Digital versions of all backup data used in the analysis, including work maps.
- NSP Format Hydrology Database or Data Delivery consistent with the NSP Data Capture Standards –Appendix N of the Guidelines and Specifications for Flood Mapping Partners
- For GIS-based modeling, deliverables shall include all input and output data, intermediate data processing products, and GIS data layers.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsam.pdf.

Activity 6A – Coastal Flood Hazard Analyses

This Activity is not applicable to this MAS.

Activity 7 - Independent QA/QC Review of Hydrologic Analyses

Responsible Mapping Partner: CTP, FEMA

Scope: The CTP shall review the technical, scientific, and other information generated under Activity 6 to ensure that the data and modeling are consistent with FEMA standards and standard engineering practice and are sufficient to prepare the DFIRM. If the CTP utilizes a contractor to perform the QA/QC, the contractor shall not be the same one who performed the original analyses. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer. This work shall include, at a minimum, the activities listed below.

- Review the submittal for technical and regulatory adequacy, completeness of required information, and supporting data and documentation. The technical review is to focus on the following:
  - Use of acceptable models;
  - Use of appropriate methodology(ies);
  - Correctly applied methodology(ies)/model(s), including QC of input parameters;
  - Comparison with gage data and/or regression equations, if appropriate; and
  - Comparison with discharges for contiguous reaches or flooding sources.

The CTP shall:

- Maintain records of all contacts, reviews, recommendations, and actions and make them readily available to FEMA.

- Maintain an archive of all data submitted for hydrologic modeling review. (All supporting data must be retained for 3 years from the date funding recipient submits its final expenditure report to FEMA.)

Standards: All work under Activity 7 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the Technical Support Data Notebook (TSDN) format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the CTP shall make the following products available to FEMA by uploading the digital data to the Multi-Hazard Information Platform (MIP) or by submitting the data to the FEMA Regional Project Officer in digital format if the MIP is unavailable. This submittal will occur in accordance with the schedule outlined in Section 6 for this Activity.

- A Summary Report that describes the findings of the independent QA/QC review and

- Recommendations to resolve any problems that are identified during the independent QA/QC review and documentation of how the problems were resolved.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsam.pdf.

Activity 7A - Independent QA/QC Review of Coastal Hazard Analyses

This Activity is not applicable to this MAS.

Activity 8 – Hydraulic Analyses

Responsible Mapping Partner: CTP

Scope: The CTP shall perform hydraulic analyses for the flooding sources listed in Appendices A-H. The modeling will include the 10-, 2-, 1-, and 0.2-percent-annual-chance events based on peak discharges computed under Activity 6. The hydraulic methods used for this analysis will involve step backwater calculations performed using a FEMA accepted version of the US Army Corps of Engineers Hydraulic Engineering Center River Analysis System (HEC-RAS) computer model.

The CTP shall use the cross-section and field data collected under Activity 3 to perform the hydraulic analyses. The hydraulic analyses will be used to establish flood elevations and regulatory floodways for the subject flooding sources.

This Activity will also include production of graphical flood profiles using RAS-PLOT or similar software packages. Graphical flood profiles will be produced according to guidance provided in Appendix J of the *Guidelines and Specifications for Flood Hazard Mapping Partners*. The *Guidelines and Specifications for Flood Hazard Mapping Partners* may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/fhm/dl_cgs.shtm .

Subtask 8.1 - Leverage Existing Studies

Scope: It is anticipated that agency Mapping Partners; such as the US Army Corps of Engineers (USACE), the Natural Resources Conservation Service (NRCS) or USGS, have performed detailed analyses for certain flooding sources listed in Appendices A-H of this MAS that have not been previously submitted to FEMA, but are acceptable for floodplain management purposes. The CTP shall obtain these studies, review the data for applicability, and provide documentation pertaining to FEMA compliance. Where these studies are identified during the projects, and are scoped as leverage studies, the CTP shall incorporate the study data into the production efforts. The CTP will perform QA/QC on leverage study information received from project partner(s) before incorporation into the production process. The CTP will format the results of leverage studies, but the certification requirements for the studies will revert to the parent agency that produced the study.

Subtask 8.2 – Limited Detailed Studies

Scope: The CTP shall perform limited detailed hydraulic analyses for the specific flooding sources listed in Appendices A-H of this MAS. For new limited detailed studies, the CTP shall incorporate new or revised hydrologic modeling and shall use the topographic data and field reconnaissance data acquired under Activities 3 and 4 to create limited detailed hydraulic models for the identified study reaches. The CTP shall also incorporate existing structure data from the Kentucky Transportation Cabinet's (KYTC) Bridge Scour database or other available sources into the hydraulic models. If required, the CTP shall determine the opening size and shape of applicable hydraulic structures by field measurements during Activity 3 in order to perform the required analyses. It is assumed that field measurements taken for the purposes of performing limited detailed analyses are intended to characterize the opening sizes and do not require detailed elevation data. It is further assumed that collection of limited detailed data is not required to be performed according to the accuracy and precision specified in Appendix A of *Guidelines and Specifications for Flood Hazard Mapping Partners.*

The hydraulic methods used for limited detailed studies will involve step backwater calculations performed using a FEMA accepted version of the US Army Corps of Engineers Hydraulic Engineering Center River Analysis System (HEC-RAS) computer model. For new or revised limited detailed analyses, the hydraulic modeling will only include the 1-percent-annual-chance event and will not include floodway analyses. The CTP will not prepare graphical flood profiles for study reaches studied by limited detailed methods.

Subtask 8.3 – Approximate Studies

Scope: The CTP shall perform approximate hydraulic analyses for the specific flooding sources listed in Appendices A-H of this MAS. For new approximate studies, the CTP shall incorporate new or revised hydrologic modeling and shall use the topographic data and field reconnaissance data acquired under Activities 3 and 4 to create approximate hydraulic models for the identified study reaches.

The hydraulic methods used for approximate studies will involve step backwater calculations performed using a FEMA accepted version of the US Army Corps of Engineers Hydraulic Engineering Center River Analysis System (HEC-RAS) computer model or the FEMA Quick-2

computer model. For new or revised approximate analyses, the hydraulic modeling will only include the 1-percent-annual-chance event and will not include floodway analyses. The CTP will not prepare graphical flood profiles for study reaches studied by approximate methods.

The CTP may use the FEMA CHECK-2 or CHECK-RAS checking program to check the reasonableness of the hydraulic analyses. To facilitate the independent QA/QC review under Activity 9, the CTP will provide explanations for unresolved messages from the CHECK-2 or CHECK-RAS program, as appropriate. In addition, the CTP shall address all concerns or questions regarding Activity 8 that are raised by FEMA during the independent QA/QC review under Activity 9.

The CTP shall document automated data processing and modeling algorithms for GIS-based modeling and provide them to FEMA for review to ensure they are consistent with the standards outlined above. Digital datasets are to be documented and provided to FEMA for approval before performing the hydraulic analyses to ensure the datasets meet minimum requirements. If non-commercial (i.e., custom-developed) software is used for the analyses, then the CTP shall provide full user documentation, technical algorithm documentation, and software to FEMA for review before performing the hydraulic analyses.

Standards: All work under Activity 8 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: Upon completion of hydraulic modeling for the identified flooding sources, the CTP shall upload the digital data to the MIP or submit the data to the FEMA Regional Project Officer in digital format if the MIP is unavailable, so that the CTP can access it for an independent QA/QC review under Activity 9 in accordance with the schedule outlined in Section 6 for this Activity.

In accordance with the Technical Support Data Notebook (TSDN) format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the CTP shall make the following products available to FEMA. This submittal will occur in accordance with the schedule outlined in Section 6 for this Activity. Where paper documentation is required by State Law for Professional certifications, the CTP shall submit hardcopy in addition to a scanned version of the hardcopy for the digital record.

- Digital profiles of the 10-, 2-, 1- and 0.2-percent-annual-chance water-surface elevations representing existing conditions using the FEMA RASPLOT program or similar software;
- Digital Floodway Data Tables for each flooding source that is compatible with the DFIRM database;
- Digital hydraulic modeling (input and output) files;
- Digital tables with range of Manning's "n" values;
- Explanations for unresolved messages from the CHECK-2 or CHECK-RAS program, as appropriate;
- Digital versions of all backup data used in the analyses;
- Digital versions of draft text for inclusion in the FIS report.
- For GIS-based modeling, deliverables include all input and output data, intermediate data processing products, GIS data layers, and final products in the format of the DFIRM database structure.

- NSP Format Hydraulic Database or Data Delivery consistent with the NSP Data Capture Standards –Appendix N of the Guidelines and Specifications for Flood Mapping Partners

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsam.pdf.

Activity 9 - Independent QA/QC Review of Hydraulic Analyses

Responsible Mapping Partner: CTP, FEMA

Scope: The CTP shall review the technical, scientific, and other information generated under Activity 8 to ensure that the data and modeling are consistent with FEMA standards and standard engineering practice and are sufficient to revise the FIRM. If the CTP utilizes a contractor to perform the QA/QC, the contractor shall not be the same one who performed the original analyses. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer. This work shall include, at a minimum, the activities listed below.

- Review the submittal for technical and regulatory adequacy, completeness of required information, and supporting data and documentation. The technical review is to focus on the following:
  - Use of acceptable model(s);
  - Starting water-surface elevations;
  - Cross-section geometry;
  - Manning's "n" values and expansion/contraction coefficients;
  - Bridge and culvert modeling;
  - Flood discharges;
  - Regulatory floodway computation methods; and
  - Tie-in to upstream and downstream non-revised Flood Profiles.

The CTP shall:

- Use the CHECK-2 or CHECK-RAS program as appropriate to flag potential problems and focus review efforts.
- Maintain records of all contacts, reviews, recommendations, and actions and make them readily available to FEMA.
- Maintain an archive of all data submitted for hydraulic modeling review. (All supporting data must be retained for 3 years from the date funding recipient submits its final expenditure report to FEMA.)

Standards: All work under Activity 9 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the Technical Support Data Notebook (TSDN) format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the CTP shall make the following products available to FEMA by uploading the digital data to the Multi-Hazard Information Platform (MIP) or by submitting the data to the FEMA Regional Project Officer in digital format if the MIP is unavailable. This submittal will occur in accordance with the schedule outlined in Section 6 for this Activity.

- A Summary Report that describes the findings of the independent QA/QC review; and
- Recommendations to resolve any problems that are identified during the independent QA/QC review and documentation of how the problems were resolved; and
- If the data changed during the QA/QC process under Activity 7 or this Activity, then the updated and verified deliverables from Activity 6 and 8 will be resubmitted at this time.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsam.pdf.

Activity 10 - Floodplain Mapping (Detailed Riverine Analysis)

Responsible Mapping Partner: CTP

Scope: The CTP shall delineate the 1- and 0.2-percent-annual-chance floodplain boundaries and the regulatory floodway boundaries (if required) for the flooding sources for which detailed hydrologic, and/or hydraulic analyses were performed. The CTP shall incorporate all new or revised hydrologic and hydraulic modeling and shall use the topographic data acquired under Activity 4 to delineate the floodplain and regulatory floodway boundaries on a digital work map. In addition, the CTP shall incorporate the results of all effective Letters of Map Change (LOMCs) within the revised areas as appropriate. Also, the CTP shall address all concerns or questions regarding Activity 10 that are raised by FEMA during the independent QA/QC review under Activity 11.

Activity 10A - Floodplain Mapping (Redelineation of Detailed Floodplain Boundaries Using Updated Topographic Data)

Responsible Mapping Partner: CTP

Scope: The CTP shall delineate the 1- and 0.2-percent-annual-chance floodplain boundaries and the regulatory floodway boundaries (if required) for the flooding sources listed in Appendices A-H where detailed studies exist and are being remapped to better topography or where leverage study data is being mapped. The CTP shall use the topographic data acquired under Activity 4 to delineate the floodplain and regulatory floodway boundaries as appropriate on a digital work map.

If the new topographic data do not reflect the same hydraulic characteristics as in effective study, the CTP shall evaluate the topographic data to determine if changes are significant enough to invalidate the floodplain boundary and regulatory floodway boundary redelineations. If so, the CTP shall contact the FEMA Regional Project Officer identified in Section 12 of this MAS with a recommendation.

For detailed study areas that will be redelineated as listed in Appendices A-H, this activity also includes datum adjustments and production of portions of the FIS Report. The CTP shall perform datum adjustments for effective flood hazard data according to the procedures outlined in Appendix B of the *Guidelines and Specifications for Flood Hazard Mapping Partners.* Effective graphical flood profiles

and tabular data will be adjusted and reproduced in a unified and continuous Countywide format according to the methods described in Activity 8.

In addition, the CTP shall address all concerns or questions regarding Activity 10A that are raised by FEMA during the independent QA/QC review under Activity 11.

Activity 10B - Floodplain Mapping (Refinement or Creation of Zone A)

Responsible Mapping Partner: CTP

Scope: The CTP shall delineate the 1-percent-annual-chance floodplain boundaries for the flooding sources listed in the Scoping Reports included in Appendices A-H. The CTP shall use existing topographic data or the topographic data acquired under Activity 2 to delineate the floodplain boundaries on a digital work map. In addition, the CTP shall address all concerns or questions regarding Activity 10B that are raised by FEMA during the independent QA/QC review under Activity 11.

The CTP may expand on the approaches for analyzing Zone A areas outlined in *Guidelines and Specifications for Flood Hazard Mapping Partners* and in FEMA 265, *Managing Floodplain Development in Approximate Zone A Areas* (April 1995), and/or develop new approaches. Such approaches must be coordinated with the FEMA Regional Project Officer identified in Section 12 of this MAS before analysis and mapping begin.

Standards: All work under Activity 10, 10A, and 10B shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables for Activities 10 / 10A / 10B: Upon completion of floodplain mapping for the identified flooding sources with new or revised flood hazard data, the CTP shall upload the digital data to the MIP or submit the data to the FEMA Regional Project Officer in digital format if the MIP is unavailable, so that the CTP can access it for an independent QA/QC review under Activity 11 in accordance with the schedule outlined in Section 6 for this Activity.

In accordance with the Technical Support Data Notebook (TSDN) format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the CTP shall make the following products available to FEMA. This submittal will occur in accordance with the schedule outlined in Section 6 for this Activity. Where paper documentation is required by State Law for Professional certifications, the CTP shall submit hardcopy in addition to a scanned version of the hardcopy for the digital record.

- Digital work maps showing the 1- and 0.2-percent-annual-chance floodplain boundary delineations, regulatory floodway boundary delineations, cross sections, BFEs, flood insurance risk zone labels, and all applicable base map features;
- Digital Floodway Data Tables for each applicable flooding source.
- Digital profiles of the 10-, 2-, 1-, and 0.2-percent-annual-chance water-surface elevations (as applicable) using FEMA RASPLOT or similar software.
- DFIRM mapping files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Metadata files describing the DFIRM data, including all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*;

- An explanation for the use of existing topography for the studied reaches, if appropriate.
- Written summary of the analysis methodologies;
- Any backup or supplemental information, including supporting calculations and assumptions for any computed 1-percent-annual-chance water-surface elevations used in the mapping required for the independent QA/QC review under Activity 11;
- Digital versions of input and output for any computer programs that were used;
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM.
- NSP Format Mapping Database or Data Delivery consistent with the NSP Data Capture Standards –Appendix N of the Guidelines and Specifications for Flood Mapping Partners
- If automated GIS-based models are applied, all input data, output data, intermediate data processing products, and GIS data layers shall be submitted.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsam.pdf.

Activity 11 - Independent QA/QC Review of Floodplain Mapping (Revised Areas)

Responsible Mapping Partner: CTP, FEMA

Scope: The CTP shall review the floodplain mapping generated under Activities 10, 10A, and 10B to ensure that the results of the analyses performed are accurately represented. If the CTP utilizes a contractor to perform the QA/QC, the contractor shall not be the same one who performed the original analyses. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer. This work shall include, at a minimum, the activities listed below.

- Review the cross sections for proper location and orientation on the work map and agreement with the Floodway Data Table.
- Review the BFEs shown on the work map for proper location and agreement with the results of the hydraulic modeling.
- Review the regulatory floodway widths for agreement with the widths shown in the Floodway Data Table and the results of the hydraulic modeling.
- Review the floodplain boundaries for agreement with the flood elevations shown in the Floodway Data Table and the contour lines and other topographic information shown on the work maps.
- Review the floodplain widths at cross sections as shown on the work maps to ensure they match the Floodway Data Table.
- Review the floodplain boundaries as shown on the work maps to ensure they match the Flood Profiles.
- Review the flood insurance risk zones as shown on the work maps to ensure they are labeled properly.

- Review the DFIRM mapping files to ensure they were prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners.*
- Review the metadata files to ensure they include all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners.*

Standards: All work under Activity 11 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the Technical Support Data Notebook (TSDN) format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the CTP shall make the following products available to FEMA by uploading the digital data to the Multi-Hazard Information Platform (MIP) or by submitting the data to the FEMA Regional Project Officer in digital format if the MIP is unavailable. This submittal will occur in accordance with the schedule outlined in Section 6 for this Activity.

- A Summary Report that describes the findings of the QA/QC review, noting any deficiencies in or agreeing with the mapping results;
- Recommendations to resolve any problems that are identified during the independent QA/QC review and documentation of how the problems were resolved;
- An annotated work map with all questions and/or concerns indicated, if necessary.
- If the data changed during the QA/QC process, then the updated deliverables from Activity 10, 10A and 10B will be resubmitted at this time.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsam.pdf.

Activity 12 - Base Map Acquisition

Responsible Mapping Partner: CTP

Scope: Activity 10 consists of obtaining the digital base map for the project. The CTP shall obtain, format, and provide the digital base map for each of the projects according to the following required activities:

- Obtain digital files of the applicable base map data. These projects will be mapped in raster format.
- Secure necessary permissions from the map source to allow FEMA's use and distribution of hardcopy and digital map products using the digital base map, free of charge.
- Certify that the digital data meets the minimum standards and specifications that FEMA requires for DFIRM production.
- Populate the DFIRM database with the information required by FEMA.

Standards: All work under Activity 12 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the Technical Support Data Notebook (TSDN) format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the CTP shall make the following products available to FEMA by uploading the digital data to the Multi-Hazard Information Platform (MIP) or by submitting the data to the FEMA Regional Project Officer in digital format if the MIP is unavailable. This submittal will occur in accordance with the schedule outlined in Section 6 for this Activity.

- Written certification that the digital data meet the minimum standards and specifications and
- Documentation that FEMA can use the digital base map.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsam.pdf.

Activity 13 – DFIRM Production (Non-Revised Areas)

Responsible Mapping Partner: CTP

Scope: For all flooding sources except those segments for which updated flood data will be developed under Activities 1 through 11, the CTP shall convert the information shown on the effective FIRM and Flood Boundary Floodway Map (FBFM) panels for all incorporated and unincorporated areas of each of the project counties to digital format in conformance with FEMA DFIRM specifications. The CTP shall use the base map acquired under Activity 12 for the conversion. The CTP shall digitize all effective FIRM and FBFM panels for communities in the counties. The CTP also shall incorporate the results of LOMCs issued by FEMA since the date of the current effective FIRM for each affected community.

Also, the CTP shall address all comments and questions regarding Activity 13 that are raised by FEMA during the independent QA/QC review under Activity 13A.

The CTP shall not digitize the flood theme for those segments of flooding sources for which updated flood data will be developed. Rather, the CTP shall leave these as "holes" in the digital flood theme that will be filled in as part of Activity 14 using the digital flood data developed under Activities 10, 10A, and 10B.

Standards: All work under Activity 13 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: Upon completion of data incorporation from all effective DFIRM panels, the CTP shall upload the digital data to the MIP or submit the data to the FEMA Regional Project Officer in digital format if the MIP is unavailable, so that the CTP can access it for an independent QA/QC review under Activity 13A in accordance with the schedule outlined in Section 6 for this Activity.

In accordance with the Technical Support Data Notebook (TSDN) format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the CTP shall make the following products available to FEMA. This submittal will occur in accordance with the schedule outlined in Section 6 for this Activity.

- Digital work maps showing the 1- and 0.2-percent-annual-chance floodplain boundary delineations, regulatory floodway boundary delineations, cross sections, BFEs, flood insurance risk zone labels, and all applicable base map features;

- DFIRM mapping files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Metadata files describing the DFIRM data, including all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Complete set of plots of DFIRM panels showing all detailed flood hazard information at a suitable scale; and
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM, including a check that the road and floodplain relationship is maintained for all non-revised areas.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsam.pdf.

Activity 13A – Independent QA/QC Review of DFIRM Production (Non-Revised Areas)

Responsible Mapping Partner: CTP, FEMA

Scope: The CTP shall review the DFIRM panels generated under Activity 13 to ensure that the new DFIRM panels accurately represent the information shown on the effective FIRMs and FBFMs for the area mapped. If the CTP utilizes a contractor to perform the QA/QC, the contractor shall not be the same one who performed the original analyses. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer. This work shall include, at a minimum, checking the following:

- Cross sections were properly located and oriented as shown on the FIRM or FBFM.
- BFEs are properly located and agree with the BFEs shown on the FIRM.
- Regulatory floodway widths agree with the widths shown on the FIRM or FBFM.
- The 1 and 0.2-percent-annual-chance floodplain boundaries agree with the floodplain boundaries shown on the FIRM and the contour lines, other topographic information, and planimetric information shown on the DFIRM base.
- Flood insurance risk zone designations are indicated properly.
- Road and floodplain relationships are maintained for all unrevised areas.
- DFIRM mapping files meet the GIS file and database format requirements specified in FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners* and conform to those requirements for content and attribution.
- Metadata files describing the DFIRM data include the required information.

Standards: All work under Activity 13A shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the Technical Support Data Notebook (TSDN) format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the CTP shall make the following products available to FEMA by uploading the digital data to the Multi-Hazard Information Platform (MIP) or by submitting the data to the FEMA Regional Project Officer in digital format if the MIP is unavailable. This submittal will occur in accordance with the schedule outlined in Section 6 for this Activity.

- A Summary Report that describes the findings of the QA/QC review noting any deficiencies in or agreeing with the mapping results;
- Recommendations to resolve any problems that are identified during the independent QA/QC review and documentation of how the problems were resolved; and
- An annotated copy of the DFIRM with all questions and/or concerns indicated, if necessary.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsam.pdf.

Activity 14 –DFIRM Production (Merging Revised and Non-Revised Information)

Responsible Mapping Partner: CTP

Scope: Upon completion of the floodplain mapping activities for the revised areas (Activities 10, 10A, and/or 10B) and the DFIRM production for non-revised areas (Activity 13), the CTP shall merge the digital floodplain data into a single, updated DFIRM. This work is to include tie-in of flood hazard information for areas that were not studied as part of the Flood Map Project documented in this MAS. The CTP also shall tie in the revised and non-revised Flood Profiles, floodplain boundaries, and regulatory floodway boundaries with contiguous communities that were not studied as part of the Flood Map Project documented in this MAS. The CTP shall coordinate with FEMA and those Mapping Partners responsible for Activities 10, 10A, 10B, and 13, as necessary, to resolve any potential tie-in issues.

In addition, the CTP shall also prepare a Countywide FIS report during this Activity. The report will combine data from effective FIS reports and pertinent new data per this MAS. The Countywide FIS Report shall be prepared and formatted in accordance with Appendix J of the *Guidelines and Specifications for Flood Hazard Mapping Partners*.

Standards: All work under Activity 14 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the Technical Support Data Notebook (TSDN) format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the CTP shall make the following products available to FEMA by uploading the digital data to the Multi-Hazard Information Platform (MIP) or by submitting the data to the FEMA Regional Project Officer in digital format if the MIP is unavailable. This submittal will occur in accordance with the schedule outlined in Section 6 for this Activity.

- Digital work maps showing the 1- and 0.2-percent-annual-chance floodplain boundary delineations, regulatory floodway boundary delineations, cross sections, BFEs, flood insurance risk zone labels, and all applicable base map features;

- DFIRM mapping files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Metadata files describing the DFIRM data, including all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Digital DRAFT FIS Report in Countywide format.
- Complete set of plots of DFIRM panels showing all detailed flood hazard information at a suitable scale; and
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsam.pdf.

Activity 14A – DFIRM Production (Application of DFIRM Graphics and Database Specifications)

Responsible Mapping Partner: CTP

Scope: The CTP shall apply the final FEMA DFIRM graphic and database specifications to the DFIRM files produced under Activity 14. This work shall include adding all required annotation, line pattern, area shading, and map collar information (e.g., map borders, title blocks, legends, notes to user). The CTP will be preparing the database for this project in the Standard format. The database shall be produced in accordance with Appendix L of the Guides and Specifications for Flood Hazard Mapping Partners. The CTP shall coordinate with those Mapping Partners responsible for Activities 10, 10A, 10B, 13, and 14, as necessary, to resolve any problems that are identified during Activity 14A.

Standards: All work under Activity 14A shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: Upon completion of DFIRM Production for each County, the CTP shall upload the digital data to the MIP or submit the data to the FEMA Regional Project Officer in digital format if the MIP is unavailable, so that the CTP can access it for an independent QA/QC review under Activity 14A in accordance with the schedule outlined in Section 6 for this Activity.

In accordance with the Technical Support Data Notebook (TSDN) format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the CTP shall make the following products available to FEMA. This submittal will occur in accordance with the schedule outlined in Section 6 for this Activity. Where paper documentation is required by State Law for Professional certifications, the CTP shall submit hardcopy in addition to a scanned version of the hardcopy for the digital record.

- Digital work maps showing the 1- and 0.2-percent-annual-chance floodplain boundary delineations, regulatory floodway boundary delineations, cross sections, BFEs, flood insurance risk zone labels, and all applicable base map features;
- DFIRM mapping files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*;

- Metadata files describing the DFIRM data, including all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Complete set of plots of DFIRM panels showing all detailed flood hazard information at a suitable scale; and
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM.
- NSP Format DFIRM Database or Data Delivery consistent with the NSP Data Capture Standards –Appendix N of the Guidelines and Specifications for Flood Mapping Partners

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsam.pdf.

Activity 14B – Independent QA/QC Review of DFIRM Product Meeting FEMA Graphics and Database Specifications

Responsible Mapping Partner: CTP, FEMA

Scope: Upon completion of the floodplain mapping activities (Activities 10, 10A, and/or 10B) and DFIRM production activities (Activities 13, 14, and 14A), The CTP shall review the DFIRM to ensure it meets current FEMA graphic specifications. In addition, the CTP shall review the DFIRM spatial database to determine if it meets current FEMA database specifications. The CTP shall coordinate with other Mapping Partners, as necessary, to resolve any problems identified during this QA/QC review. If the CTP utilizes a contractor to perform the QA/QC, the contractor shall not be the same one who performed the original analyses. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer. This work shall ensure that the requirements below are met.

- All required DFIRM features are accurately and legibly labeled and follow the examples shown in the FEMA DFIRM specifications. This includes all flood insurance risk zones, BFEs, cross sections, studied streams, mapped political entities, and all roads within and adjacent to the 1-percent-annual-chance floodplains.
- All DFIRM features are correctly symbolized with the appropriate symbol, line pattern, or area shading and follow the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*.
- All map collar information is complete, correct, and follows the requirements specified in *Guidelines and Specifications for Flood Hazard Mapping Partners*.
- DFIRM mapping files are in one of the GIS file and database formats specified in FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners* and conform to those specifications for content and attribution.
- DFIRM database files are in one of the database formats specified in FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners* and conform to those specifications for content and attribution.
- Metadata files describing the DFIRM data include all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*.

- The FIS report is prepared in the FEMA Countywide Format as documented in Appendix J of *Guidelines and Specifications for Flood Hazard Mapping Partners.*

Standards: All work under Activity 14B shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the Technical Support Data Notebook (TSDN) format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the CTP shall make the following products available to FEMA by uploading the digital data to the Multi-Hazard Information Platform (MIP) or by submitting the data to the FEMA Regional Project Officer in digital format if the MIP is unavailable. This submittal will occur in accordance with the schedule outlined in Section 6 for this Activity.

- A Summary Report that describes the findings of the QA/QC review noting any deficiencies in or agreeing with the mapping results and the results of all automated or manual QA/QC steps taken during the independent QA/QC review;
- Recommendations to resolve any problems that are identified during the independent QA/QC review and documentation of how the problems were resolved; and
- An annotated copy of the DFIRM with all questions and/or concerns indicated, if necessary.
- If the data changed during the QA/QC process, then the updated deliverables from Activities 10, 10A, 10B and Activities 13, 14, and 14A will be resubmitted at this time.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsam.pdf.

Activity 15 - Preliminary DFIRM and FIS Report Distribution

Responsible Mapping Partners: CTP, FEMA

Scope: Activity 15 consists of the final preparation, review, and distribution of the Preliminary copies of the DFIRM and FIS report for community official and general public review and comment. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer. The activities to be performed are summarized below.

Preliminary Transmittal Letter Preparation. The CTP shall prepare letters and transmit the Preliminary copies of the DFIRM and FIS report and related enclosures to all affected communities, all other Project Team members, the State NFIP Coordinator, the FEMA Regional Office, and others as directed by FEMA. This letter may be prepared for FEMA only or FEMA and the CTP signature.

Final QA/QC Review of Preliminary DFIRM and FIS Report: The CTP shall perform a final QA/QC review of the Preliminary DFIRM and FIS report, including all data tables, Flood Profiles, and other components of the FIS report. The QA/QC review procedures shall be consistent with the *Guidelines and Specifications for Flood Hazard Mapping Partners.*

Discrepancy Resolution: The CTP shall work to resolve discrepancies identified during the final QA/QC review.

Distribution of Preliminary DFIRM and FIS Report: The CTP shall distribute the Preliminary copies of the DFIRM and FIS report to all affected communities, all other Project Team members, the State NFIP Coordinator, the FEMA Regional Office, and others as directed by FEMA.

News Release Preparation: The CTP shall prepare news release notifications of BFE changes for all affected communities if appropriate and perform QA/QC reviews of the notices for accuracy and compliance with FEMA format requirements. The CTP shall file the notifications for later submittal to FEMA for review.

Preliminary Summary of Map Actions (SOMA) Preparation: The CTP shall prepare Preliminary SOMAs for all affected communities if appropriate. The SOMA shall list pertinent information regarding LOMCs that will be affected by the issuance of the DFIRM (i.e., superseded, incorporated, revalidated).

Standards: All work under Activity 15 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners* and the requirements documented in Section 1 and Appendix A of the FEMA *Document Control Procedures Manual*, the CTP shall make the following products available to FEMA in accordance with the schedule outlined in Section 6 for this Activity:

- Preliminary transmittal letters shall be prepared and transmitted. These letters and any additional letters requested by FEMA shall be prepared in accordance with the current version of the FEMA *Document Control Procedures Manual.*
- Preliminary copies of the DFIRM and FIS report, including all updated data tables and Flood Profiles shall be mailed to the Chief Executive Officer (CEO) and floodplain administrator of each affected community, all other Project Team members, the State NFIP Coordinator, the FEMA Regional Office, and others as directed by FEMA.
- Preliminary SOMAs, prepared in accordance with FEMA requirements, shall be provided as appropriate.
- Revised DFIRM mapping files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*, shall be provided by uploading the digital data to the MIP or submitting it by using other digital media if the MIP is unavailable.
- Revised DFIRM database files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*, shall be provided by uploading the digital data to the MIP or submitting it by using other digital media if the MIP is unavailable.
- Revised metadata files describing the DFIRM data, including all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*, shall be provided by uploading the digital data to the MIP or submitting it by using other digital media if the MIP is unavailable.
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM shall be provided.

Activity 16 - Post-Preliminary Processing

Responsible Mapping Partners: CTP, FEMA

Scope: Activity 16 consists of finalizing the DFIRM and FIS report after the Preliminary copies of the DFIRM and FIS report have been issued to community officials and the public for review and comment. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer. The activities to be performed are summarized below.

Initiation of Statutory 90-Day Appeal Period: When required, upon completion of a 30-day community comment period and/or final coordination meeting with the affected communities, the CTP shall arrange for and verify that the following activities are completed in accordance with the current version of the FEMA *Guidelines and Specifications for Flood Hazard Mapping Partners* and *Document Control Procedures Manual*:

- Proposed BFE determination letters are sent to the community CEOs and floodplain administrators.
- News release notifications of BFE changes are published in prominent newspapers with local circulation in accordance with 44 CFR.
- The CTP shall prepare the appropriate notices (Proposed Rules) are are to be published in the *Federal Register*. The CTP shall then deliver those notices to FEMA for publication.
- When the CTP holds public meetings to present and discuss the results of this Flood Map Project, FEMA may attend the meetings and assist where possible if requested.

Resolution of Appeals and Protests: The CTP shall review and resolve appeals and protests received during the 90-day appeal period. For each appeal and protest, the following activities shall be conducted as appropriate:

- Initial processing and acknowledgment of submittal;
- Technical review of submittal;
- Preparation of letter(s) requesting additional supporting data;
- Performance of revised analyses; and
- Preparation of a draft resolution letter for cosignature with FEMA and the CTP and revised DFIRM and FIS report materials for FEMA review.

The CTP shall mail all associated correspondence upon authorization by FEMA.

Preparation of Special Correspondence: The CTP shall support FEMA in responding to comments not received within the 90-day appeal period (referred to as "special correspondence"), including drafting responses for FEMA review when appropriate and finalizing responses for cosignature. The CTP also shall mail the final correspondence (and enclosures if appropriate) and distribute appropriate copies of the correspondence and enclosures upon receipt of authorization from FEMA.

Revision of FIRM and FIS Report: If necessary, the CTP shall work together with FEMA to revise the DFIRM and FIS report and shall distribute Revised Preliminary copies of the DFIRM and FIS report to

the CEO and floodplain administrator of each affected community, all other Project Team members, the State NFIP Coordinator, the FEMA Regional Office, and others as directed by FEMA.

Final SOMA Preparation: The CTP shall prepare Final SOMAs for the affected communities as appropriate.

Processing of Letter of Final Determination: The CTP shall work with FEMA to establish the effective date for the DFIRM and FIS report, and shall prepare a Letter of Final Determination (LFD) for each affected community for FEMA review in accordance with the FEMA *Document Control Procedures Manual.* They also shall mail the final signed LFDs and enclosures and distribute appropriate copies of the signed LFDs and enclosures upon receipt of authorization from FEMA.

Processing of Final DFIRM and FIS Report for Printing: The CTP shall prepare final reproduction materials for the DFIRM and FIS report and provide these materials to the FEMA Map Service Center for printing by the U.S. Government Printing Office. The CTP shall prepare the appropriate paperwork to accompany the DFIRM and FIS report (including Print Processing Worksheet, Printing Requisition Forms, and Community Map Actions Form) and transmittal letters to the community CEOs.

Revalidation Letter Processing. The CTP shall prepare and distribute letters for FEMA signature to the community CEOs and floodplain administrators to notify the affected communities about LOMCs for which determinations will remain in effect after the DFIRM and FIS report become effective.

Archiving Data: The CTP shall ensure that technical and administrative support data are packaged in the FEMA required format and stored properly in the library archives until they are transmitted to the FEMA Engineering Study Data Package Facility. In addition, the CTP will maintain copies of all data for a period of no less than 3 years.

Standards: All work under Activity 16 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners* and the requirements documented in Section 1 and Appendix A of the FEMA *Document Control Procedures Manual*, the CTP shall make the following products available to FEMA in accordance with the schedule outlined in Section 6 for this Activity:

- Documentation that the news releases were published in accordance with FEMA requirements;
- Documentation that the appropriate *Federal Register* notices (Proposed and Final Rules) were published in accordance with FEMA requirements;
- Draft and final Special Correspondence (and all associated enclosures, backup data, and other related information) for FEMA review and signature as appropriate;
- Draft and final Appeal and Protest acknowledgment, additional data, and resolution letters (and all associated enclosures, backup data, and other related information) for FEMA review and signature as appropriate;
- Draft and final LFDs (and all associated enclosures, backup data, and other related information) for FEMA review and signature;
- DFIRM negatives and final FIS report materials, including all updated data tables and Flood Profiles;

- Paperwork for the final DFIRM and FIS report materials;
- Transmittal letters for the printed DFIRM and FIS report;
- LOMC Revalidation Letters if appropriate; and
- Complete, organized archived technical and administrative support data
- Complete, organized and archived case file and flood elevation docket

SECTION 2—TECHNICAL AND ADMINISTRATIVE SUPPORT DATA SUBMITTAL

The Project Team members for this Flood Map Project that have responsibilities for activities included in this MAS shall comply with the data submittal requirements summarized below.

All supporting documentation for the activities in this Mapping Activity Statement shall be submitted in the TSDN format in accordance with Appendix M of the FEMA *Guidelines and Specifications for Flood Hazard Mapping Partners*, dated April 2003. Appendix M is available for viewing or download on the FEMA Web site at http://www.fema.gov/pdf/fhm/frm_gsam.pdf. Table 2-1 indicates the sections of the TSDN that apply to each mapping activity.

If any issues arise that could affect the completion of an activity within the proposed scope or budget, the responsible Mapping Partner shall complete a Special Problem Report (SPR) as soon as possible after the issue is identified and submitted to FEMA. The SPR is to describe the issue and propose possible resolutions. (For additional information on SPRs, refer to Appendix M, Subsection M.2.1.1 of *Guidelines and Specifications for Flood Hazard Mapping Partners*.)

Table 2-1. Mapping Activities and Applicable TSDN Sections

TSDN Section	Mapping Activities															
	1	2	3	4	5	6, 6A	7, 7A	8	9	10, 10A, 10B	11	12	13, 13A	14, 14A	15	16
General Documentation																
Special Problem Reports	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Telephone Conversation Reports	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Meeting Minutes/Reports	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
General Correspondence	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Engineering Analyses																
Hydrologic Analyses			X			X	X	X	X	X	X					
Hydraulic Analyses			X			X	X	X	X	X	X					
Key to Cross-Section Labeling			X			X	X	X	X	X	X					
Key to Transect Labeling			X			X	X	X	X	X	X					
Draft FIS Report						X	X	X	X							
Mapping Information	X	X		X	X					X	X	X	X	X	X	X
Miscellaneous Reference Information	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

SECTION 3—PERIOD OF PERFORMANCE

The mapping activities outlined in this MAS will begin per the schedule outlined in each scoping report in Appendices A-E, and will be completed in approximately 36 months. The mapping activities may be terminated at the option of FEMA or the Kentucky Division of Water in accordance with the provisions of the Partnership Agreement dated August 16, 1999. If these Mapping Activities are terminated; the remaining funds from uncompleted activities, provided by FEMA for this Mapping Activity Statement, will be returned to FEMA.

SECTION 4—FUNDING/LEVERAGE

FEMA is providing funding, in the amount of $), to the Kentucky Division of Water for the completion of this Flood Map Project. The Kentucky Division of Water shall provide any additional resources required to complete the assigned activities for this Flood Map Project. It is anticipated that the Kentucky Division of Water and its mapping partners will be providing contributions to the projects in the form of leverage studies, base map data, and QA/QC review of the floodplain delineations, DFIRM panels, and FIS deliverables. The table below includes a preliminary estimate of the amount of leverage being provided for each county based on the estimated total value of partner contributions along with the anticipated funding level provided by FEMA for the projects.

During the scoping process, additional needs may be identified. Activities associated with any additional needs would be performed based on availability of additional funds. More detailed leverage information will be determined during the detailed scoping process and reported back to FEMA at that time.

Funding for Project	FEMA $ Contribution	CTP Contribution	% Leverage	Total Project Cost
TOTAL FUNDING	)		38 %	

FEMA funds identified above are available to be used for the following activities*:

Activities	FUNDABLE?
Activity 1 – Scoping	Yes, up to 10% of total cost
Activity 2 - Outreach	Yes, up to 10% of total cost
Activity 3 – Field Surveys and Reconnaissance	Yes
Activity 4 – Topographic Data Development	No, unless approval given during scoping phase by Regional PO
Activity 5 – Independent QA/QC Review of Topographic Data	No, unless approval given during scoping phase by Regional PO
Activity 6 –Hydrologic Analyses	Yes

Activities	FUNDABLE?
Activity 6A –Coastal Flood Hazard Analyses	Yes
Activity 7–Independent QA/QC Review of Hydrologic Analyses	Yes
Activity 7A–Independent QA/QC Review of Coastal Hazard Analyses	Yes
Activity 8 – Hydraulic Analyses	Yes
Activity 9 – Independent QA/QC Review of Hydraulic Analyses	Yes
Activity 10 – Floodplain Mapping (Detailed Riverine or Coastal Analysis)	Yes
Activity 10A – Floodplain Mapping (Redelineation Using Effective Flood Profiles and Updated Topographic Data)	Yes
Activity 10B – Floodplain Mapping (Refinement or Creation of Zone A)	Yes
Activity 11 – Independent QA/QC Review of Floodplain Mapping (Revised Areas)	Yes
Activity 12 – Base Map Acquisition	No
Activity 13 – DFIRM Production (Non-Revised Areas)	Yes
Activity 13A – Independent QA/QC Review of DFIRM Production (Non-Revised Areas)	Yes
Activity 14 – DFIRM Production (Merge Revised and Non-Revised Information)	Yes
Activity 14A – Application of DFIRM Graphic and Database Specifications	Yes
Activity 14A – Independent QA/QC Review of DFIRM Product Meeting FEMA Graphic and Database Specifications	Yes
Activity 15 – Preliminary DFIRM and FIS Report Distribution	Yes
Activity 16 – Post-Preliminary Processing	Yes

*This table is for information purposes only

SECTION 5—STANDARDS

The standards relevant to this Mapping Activity Statement are provided in Tables 5-1 and 5-2. Information on the correct volume, appendix, section, or subsection of the FEMA *Guidelines and Specifications for Flood Hazard Mapping Partners* to be referenced for each mapping activity are summarized in Table 5-2.

These Guidelines are available for viewing or download from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/fhm/dl_cgs.shtm.

Table 5-1. Applicable Standards for Project Activities

Applicable Standards	Activities															
	1	2	3	4	5	6, 6A	7, 7A	8	9	10, 10A, 10B	11	12	13, 13A	14, 14A	15	16
Guidelines and Specifications for Flood Hazard Mapping Partners, April 2003	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
American Congress on Surveying and Mapping Procedures	X		X	X	X											
Global Positioning System (GPS) Surveys: National Geodetic Survey (NGS-510), "Guidelines for Establishing GPS-Derived Ellipsoid Heights," November 1997	X		X	X	X											
Engineer Manual 1110-1-1000, *Photogrammetric Mapping* (USACE), July 1, 2002	X		X	X	X											
Engineer Manual 1110-2-1003, *Hydrographic Surveys* (USACE), January 1, 2002	X		X													
"Numerical Models Accepted by FEMA for NFIP Usage," Updated April 2003	X					X	X	X	X							
Content Standard for Digital Geospatial Metadata (Federal Geographic Data Committee), 1998	X	X		X	X					X	X	X	X	X	X	X
Document Control Procedures Manual, December 2000	X	X													X	X
44 Code of Federal Regulations Part 66 and 67		X														

Table 5-2. Project Activities and Applicable Portions of FEMA Guidelines and Specifications

Activity Number	Activity Description	Applicable Volume, Section/Subsection, and Appendix
1	Scoping	Appendix I, Scoping Report document attached in Appendix A to this Mapping Activity Statement
2	Outreach	44 Code of Federal Regulations Part 66 and 67
3	Field Surveys and Reconnaissance	Volume 1, Section 1.4 (specifically Subsection 1.4.2.1) Appendix A, Sections A.4, A.5, A.6, A.7, and A.8 Appendix F, Section F.3 Appendices B, C, and M
4	Topographic Data Development	Volume 1, Section 1.4 (specifically Subsection 1.4.2.1) Appendix A, Sections A.2 , A.3, A.7, and A.8 Appendix M
5	Independent QA/QC Review of Topographic Data	Volume 1, Section 1.4 (specifically Subsections 1.4.1 and 1.4.2.1) Appendix A, Sections A.2, A.3, A.7 (specifically Subsection A.7.5), and A.8 (specifically Subsection A.8.6) Appendix M
6	Hydrologic Analyses	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2 and 1.4.2.4) Appendix A, Section A.4 Appendix C, Sections C.1 and C.7 Appendices E, F, G, H, and M
6A	Coastal Hazard Analyses	This Activity is not applicable to this MAS.

Table 5-2. Project Activities and Applicable Portions of FEMA Guidelines and Specifications (Cont'd)

Activity Number	Activity Description	Applicable Volume, Section/Subsection, and Appendix
7	Independent QA/QC Review of Hydrologic Analyses	Volume 1, Section 1.4 (specifically Subsection 1.4.1) Appendix A, Section A.4 Appendix C, Section C.2 Appendices E, F, G, H, and M
7A	Independent QA/QC Review of Coastal Hazard Analyses	This Activity is not applicable to this MAS.
8	Hydraulic Analyses	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2 and 1.4.2.4) Appendix A, Section A.4 (specifically Subsection A.4.7) Appendix C, Sections C.3 and C.7 Appendices B, E, F, G, H, and M
9	Independent QA/QC Review of Hydraulic Analyses	Volume 1, Section 1.4 (specifically Subsection 1.4.1) Appendix A, Section A.4 (specifically Subsection A.4.7) Appendix C, Section C.5 Appendices B, E, F, G, H, and M
10	Floodplain Mapping (Detailed Riverine or Coastal Analysis)	Volume 1, Section 1.4 (specifically Subsection 1.4.2.3) Appendix C, Sections C. 4 and C.6 Appendix D, Sections D.2 (specifically Subsection D.2.7) and D.3 (specifically Subsection D.3.7) Appendices E, F, G, H, K, L, and M
10A	Floodplain Mapping (Redelineation Using Effective Flood Profiles and Updated Topographic Data)	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2 and 1.4.2.3) Appendix C, Section C.6 (specifically Subsection C.6.1.3) Appendices K. L, and M

Table 5-2. Project Activities and Applicable Portions of FEMA Guidelines and Specifications (Cont'd)

Activity Number	Activity Description	Applicable Volume, Section/Subsection, and Appendix
10B	Floodplain Mapping (Refinement or Creation of Zone A)	Volume 1, Section 1.4 (specifically Subsection 1.4.2.3) Appendix C, Sections C.4 and C.6 Appendices K, L, and M
11	Independent QA/QC Review of Floodplain Mapping (Revised Areas)	Volume 1, Section 1.4 (specifically Subsections 1.4.1 and 1.4.2.3) Appendix C, Sections C.4 and C.6 Appendix D, Sections D.2 (specifically Subsection D.2.7) and D.3 (specifically Subsection D.3.7) Appendices E, F, G, H, K, L, and M
12	Base Map Acquisition and Preparation	Volume 1, Section 1.3 (specifically Subsection 1.3.1.8) and 1.4 (specifically Subsections 1.4.3.1 and 1.4.3.2) Appendix A, Section A.1 (specifically Subsection A.1.1)
13	DFIRM Production (Non-Revised Areas)	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2, 1.4.2.3, and 1.4.3.2) Appendices K, L, and M
13A	Independent QA/QC Review of DFIRM Production (Non-Revised Areas)	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2, 1.4.2.3, and 1.4.3.2) Appendices K, L, and M
14	DFIRM Production (Merging Revised and Non-Revised Areas)	Volume 1, Section 1.4 (specifically Subsections 1.4.2.3 and 1.4.3.3) Appendices K, L, and M
14A	DFIRM Production (Application of FEMA Graphics and Database Specifications)	Volume 1, Section 1.4 (specifically Subsections 1.4.2.3, 1.4.3.3, 1.4.3.9, and 1.4.3.10) Appendices K, L, and M
14B	Independent QA/QC Review of DFIRM Product Meeting FEMA Graphics and Database Specifications	Volume 1, Section 1.4 (specifically Subsections 1.4.2.3, 1.4.3.3, 1.4.3.9, and 1.4.3.10) Appendices K, L, and M

Table 5-2. Project Activities and Applicable Portions of FEMA Guidelines and Specifications (Cont'd)

Activity Number	Activity Description	Applicable Volume, Section/Subsection, and Appendix
15	Preliminary DFIRM and FIS Report Distribution	Volume 1, Sections 1.4 (specifically Subsections 1.4.2 and 1.4.3) and 1.5 (specifically Subsection 1.5.1) Appendices J, K, L, and M
16	Post-Preliminary Processing	Volume 1, Section 1.5 (specifically Subsection 1.5.2) Appendices J, K, L, and M

SECTION 6—SCHEDULE

The activities documented in this MAS shall be completed in accordance with the project schedule below. If changes to this schedule are required, the responsible Mapping Partner shall coordinate with FEMA and the other Mapping Partners in a timely manner.

Activities	RESPONSIBLE PARTNER(S)	DATE DUE (Month)
Activity 1 – Scoping	CTP	3
Activity 2 – Outreach	CTP	36
Activity 3 – Field Surveys and Reconnaissance	CTP	6
Activity 4 – Topographic Data Development	CTP	6
Activity 5 – Independent QA/QC Review of Topographic Data	CTP, FEMA	7
Activity 6 – Hydrologic Analyses	CTP	9
Activity 6A – Coastal Flood Hazard Analyses	N/A	
Activity 7 – Independent QA/QC Review of Hydrologic Analyses	CTP, FEMA	10
Activity 7A – Independent QA/QC Review of Coastal Hazard Analyses	N/A	
Activity 8 – Hydraulic Analyses	CTP	11
Activity 9 – Independent QA/QC Review of Hydraulic Analyses	CTP, FEMA	12
Activity 10 – Floodplain Mapping (Detailed Riverine or Coastal Analysis) Activity 10A – Floodplain Mapping (Redelineation Using Effective Flood Profiles and Updated Topographic Data) Activity 10B – Floodplain Mapping (Refinement or Creation of Zone A)	CTP	13
Activity 11 – Independent QA/QC Review of Floodplain Mapping (Revised Areas)	CTP, FEMA	14
Activity 12 – Base Map Acquisition	CTP	7
Activity 13 – DFIRM Production (Non-Revised Areas)	CTP	13
Activity 13A – Independent QA/QC Review of DFIRM Production (Non-Revised Areas)	CTP, FEMA	14

Activities	RESPONSIBLE PARTNER(S)	DATE DUE (Month)
Activity 14 – DFIRM Production (Merge Revised and Non-Revised Information)	CTP	15
Activity 14A – Application of DFIRM Graphic and Database Specifications	CTP	15
Activity 14A – Independent QA/QC Review of DFIRM Product Meeting FEMA Graphic and Database Specifications	CTP, FEMA	16
Activity 15 – Preliminary DFIRM and FIS Report Distribution	CTP, FEMA	18
Activity 16 – Post-Preliminary Processing	CTP, FEMA	36

SECTION 7—CERTIFICATIONS

Activity 3 (Field Surveys and Reconnaissance) and Activity 4 (Topographic Data Development)

A Registered Professional Engineer or Licensed Land Surveyor shall certify topographic data, in accordance with 44 CFR 65.5(c). Certification of topographic data by the American Society for Photogrammetry and Remote Sensing is also acceptable.

Activity 6 (Hydrologic Analyses), Activity 8 (Hydraulic Analyses), Activity 10 (Floodplain Mapping– Detailed Riverine or Coastal Analysis), Activity 10A (Floodplain Mapping {Redelineation Using Effective Flood Profiles and Updated Topographic Data}), and Activity 10B (Floodplain Mapping {Refinement or Creation of Zone A})

- A Registered Professional Engineer shall certify hydrologic and hydraulic analyses and data in accordance with 44 CFR 65.6(f).
- A Registered Professional Engineer or Licensed Land Surveyor shall certify topographic information in accordance with 44 CFR 65.5(c).
- Any levee systems to be accredited will be certified in accordance with 44 CFR 65.10(e) in addition to subsequent FEMA guidance via procedure memoranda.

Activity 10 (Floodplain Mapping– Detailed Riverine or Coastal Analysis), Activity 10A (Floodplain Mapping {Redelineation Using Effective Flood Profiles and Updated Topographic Data}), and Activity 10B (Floodplain Mapping {Refinement or Creation of Zone A}), Activity 11 (Independent QA/QC Review of Floodplain Mapping {Revised Areas}), Activity 13 (DFIRM Production {Non-Revised Areas}), Activity 14 (DFIRM Production {Merging Revised and Non-Revised Information}), and Activity 14A (DFIRM Production {Application of FEMA Graphics and Database Specifications})

The DFIRM metadata files shall include a description of the horizontal and vertical accuracy of the DFIRM base map and floodplain information.

Activity 12 (Base Map Acquisition and Preparation)

- A community official or responsible party shall provide written certification that the digital data meet FEMA minimum standards and specifications.
- The responsible Mapping Partner shall provide documentation that the digital base map can be used by FEMA. Please note that uploading base map data to the MIP does not constitute agreement that the digital base map can be used by FEMA. Documentation that the digital base map can be used by FEMA will still be required.

Certifications must be made at the time the intermediate data is submitted. For example, if hydrologic data is submitted, certification will be required at the time it is submitted.

SECTION 8—TECHNICAL ASSISTANCE AND RESOURCES

Project Team members may obtain copies of FEMA-issued LOMCs, archived engineering backup data, and data collected as part of the Mapping Needs Assessment Process from the NSP, who may be contacted through your Regional Project Officer.

General technical and programmatic information, such as FEMA 265 and the Quick-2 computer program, can be downloaded from the FEMA Web site (http://www.fema.gov./fhm/). Specific technical and programmatic support may be provided through the NSP; such assistance should be requested through the FEMA Project Officer specified in Section 12 of this MAS.

Project Team members also may consult with the FEMA Regional Project Officer to request support in the areas of selection of data sources, digital data accuracy standards, assessment of vertical data accuracy, data collection methods or subcontractors, and GIS-based engineering and modeling training.

SECTION 9—CONTRACTORS

The Kentucky Division of Water intends to use the services of Fuller, Mossbarger, Scott and May Engineers, Inc. as a contractor for this Flood Map Project. The Kentucky Division of Water shall ensure that the procurement for all contractors used for this Flood Map Project complies with the requirements of 44 CFR 13.36.

Part 13 may be downloaded in PDF or text format from the U.S. Government Printing Office Web site at http://www.access.gpo.gov/nara/cfr/waisidx_04/44cfr13_04.html.

SECTION 10—REPORTING

FINANCIAL REPORTING:

Because funding has been provided to The Kentucky Division of Water by FEMA, financial reporting requirements for The Kentucky Division of Water will be in accordance with Cooperative Agreement Articles V and VI.

The NSP shall provide financial reports to the FEMA Regional Project Officer and Assistance Officer in accordance with the terms of the signed Cooperative Agreement for this Mapping Activity Statement.

STATUS REPORTING:

Status reports will be submitted on a quarterly basis in accordance with the financial reporting submittals. At a minimum these reports will include a summary of the work as outlined in the Cooperative Technical Partner (CTP)/Map Modernization Project Quarterly Report located in Appendix B of this Mapping Activity Statement. The Project Officer, as needed, may request additional information on status.

The Kentucky Division of Water may meet with the NSP and/or FEMA more frequently (up to bi-weekly if needed) to review the progress of the project in addition to the quarterly financial and status submittals. These meetings will alternate between FEMA's Regional Office, the The Kentucky Division of Water office and conference calls as necessary.

Section 11—Project Coordination

Throughout the project, all members of the Project Team will coordinate, as necessary, to ensure the products meet the technical and format specifications required and contain accurate, up-to-date information. Coordination activities shall include:

- Meetings, teleconferences, and videoconferences with FEMA and other Project Team members as needed
- Telephone conversations with FEMA and other Project Team members on a scheduled basis or ad hoc basis, as needed;
- Updates to the MIP, and other FEMA status information systems in accordance with requirements in Volumes 1 and 3 of *Guidelines and Specifications for Flood Hazard Mapping Partners*; and
- E-mail, facsimile transmissions, and letters, as required.

Section 12—Points of Contact

The points of contact for this Flood Map Project are Laura Algeo, the FEMA Regional Project Officer; Carey Johnson, the Project Manager for the Kentucky Division of Water; or subsequent personnel of comparable experience who are appointed to fulfill these responsibilities. When necessary, the any additional assistance of FEMA should be requested through the FEMA Regional Project Officer.

Each party has caused this MAS to be executed by its duly authorized representative.

Carey Johnson
Project Manager
Kentucky Division of Water

6/27/2005
Date

Laura Algeo, P.E.
Regional Project Officer
Federal Emergency Management Agency, Region IV

6/30/2005
Date

Appendix A
Breathitt County, Kentucky
Project Scoping

Appendix B
Clay County, Kentucky
Project Scoping

Appendix C
Gallatin County, Kentucky
Project Scoping

Appendix D
Kenton County, Kentucky
Project Scoping

Appendix E
Knott County, Kentucky
Project Scoping

Appendix F
Leslie County, Kentucky
Project Scoping

Appendix G
Letcher County, Kentucky
Project Scoping

Appendix H
Trimble County, Kentucky
Project Scoping